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ABSTRACT

The report focuses on the education of visually handicapped children in Western Australia. Chapter 1 deals with the medical terminology of visual impairment and related educational issues. An historical review is the content of a second chapter, and Chapter 3 provides information on educational programs for visually handicapped children at the preschool, primary, secondary, and post-secondary levels. A final chapter presents recommendations made by the Western Australian Council for Special Education regarding changes in the system of educational services for the visually handicapped. Among suggestions are that a centrally located library and reference center be established and that all teachers working with students using brailled materials receive an adequate braille training course before appointment. (SBH)

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EDUCATION OF VISUALLY HANDICAPPED CHILDREN IN WESTERN AUSTRALIA

Report to the Minister for Education

The Western Australian Council for Special Education

March 1978

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WESTERN AUSTRALIAN COUNCIL FOR SPECIAL EDUCATION

The Council was established by the Minister for Education in October 1974 to advise and report on all aspects of special education.

The terms of reference for the work of the Council include the following:

1. Advise and assist in the development of tertiary education programmes.
2. Advise on and commission research and evaluation in the area of special education.
3. Rationalise total State effort within the field of special education.
4. Provide a forum for debate in the field of special education.
5. Provide a liaison between professionals and between profession and community.
6. Assist and advise on programme development.
7. Provide professional arbitration in the field of special education.
8. Report and advise the Government on matters relating to special education.

The present members of the Council are:

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PREFACE

Having reported on the education of cerebral palsied children in 1975 and hearing impaired children in 1976, the Council turned its attention in 1977 to the education of visually handicapped children. The following report has resulted.

The earliest provision of any form of special education in Western Australia was for deaf children and for blind children. In some Australian States and overseas countries, such education was provided by the one institution. From the beginning Western Australia followed a pattern of totally separate provision with blind children educated at the Western Australian Industrial School for the Blind and deaf children educated at the Western Australian Deaf and Dumb Institute. This pattern of separate provision has continued up to the present time.

Council nembers wish to acknowledge the help received from various persons and organisations concerned with the educational and social welfare of visually handicapped children in Western Australia. The valuable assistance received throughout 1977 facilitated the work of the Council in developing and completing this report and Council members are deeply grateful.

CONTENTS

Page

WESTERN AUSTRALIAN COUNCIL FOR SPECIAL EDUCATION

PREFACE

CHAPTER ONE

Introduction 1

CHAPTER TWO

Historical Review 7

CHAPTER THREE

The Education of the Visually Handicapped in Western Australia 14

CHAPTER FOUR

Recommendations 27

REFERENCES 46

APPENDICES

1. Some of the more common causes of visual impairment classified according to the functional divisions of the visual system. 48

2. THE BRAILLE SOCIETY EYE CERTIFICATE 49

TABLES

Table		Page
2.1	Percentage of Year 7 Students Completing Succeeding Levels of Secondary School	11
3.1	Children in Classes for the Visually Handicapped	14
3.2	Numbers of Children Receiving Special Education for the Visually Handicapped in Western Australia in 1977	16
3.3	Incidence of Blind and Partially Sighted Children: Numbers Per 1,000 of Total School Population England, Scotland, U.S.A.	17
3.4	Incidence of Blind and Partially Sighted Children in Western Australia: Numbers Per 1,000 of Total School Population	18
4.1	Transcription Service for Schools	36
4.2	Total Material Lent to Students	36

CHAPTER ONE

INTRODUCTION

1.1 This chapter is concerned with problems of definition and terminology. Its purpose is to clarify some of the relevant concepts so that the content of the remaining chapters can be more easily interpreted. The first part of the chapter deals with some of the medical terminology and a second section discusses some of the related educational issues.

Medical and Administrative Terminology

1.2 The term visual impairment has a strong medical or biological connotation and refers to "any deviation from the normal which results in defective function, structure, organisation or development of the visual system" (Scholl, 1968, p.5). Barraga (1976) defines the term in a similar way. She states that visual impairment "denotes any clinically diagnosable deviation in the structure or functioning of the tissue or parts of the eye" (p.15). The degree of visual impairment can vary. A person with a very severe impairment may need a great deal of assistance in order to function adequately in our complex society. A person with a less severe impairment may function quote normally with or without special aids.

1.3 The term totally blind refers to those persons in whom sight is completely absent. According to Barraga (1976) the term should be used to refer to those "who have only light perception without projection, or those who are totally without the sense of

vision" (p.14). For all practical purposes many people with severely impaired vision differ little from the totally blind. The term legally blind is now used in the literature, and by agencies concerned with severely visually impaired persons, to describe those whose sight is so impaired that they may obtain some form of Government benefit on the grounds of the impairment.

1.4 Any system which classifies persons as blind must establish criteria of maximum and minimum levels. In effect, persons classified as blind fall into one of two categories. In one category are those who are totally blind and in the other are those with some residual vision, but who have a severe impairment.

1.5 It has become common practice to assess blindness in terms of the percentage of usable vision. In Australia clinical diagnosis of blindness using percentage of vision as a criterion is based on an assessment by an ophthalmologist. A person whose level of vision with maximum correction is ten per cent or less of the normal level is clinically blind. This criterion is generally accepted world wide but standards vary somewhat between different countries. The majority of assessments are based on three basic parameters. These are visual acuity, fields of vision and diplopia and muscle balance (Bougher, 1977).

1.6 Visual acuity "refers to a clinical measurement of the ability to discriminate clearly the fine details of objects or symbols at a specified distance "(Barraga, 1976, p.14). For example, visual acuity of less than 6/60 means that a person is unable to discriminate fine details at a distance of six metres which a person of normal vision (6/6) would discriminate at sixty metres. Impairment of function of the visual system (see Appendix 1) other than that involved in near and distance vision may also result in a handicap. The breadth of vision at different points of focus is referred to as the fields of vision. When a normal eye is in use "the panorama of objects, whether near or far, seen by the eye is known as the 'field of vision' or the 'visual

field" (Scottish Education Department, 1969, p.10). If the visual fields are constricted, mobility may be greatly restricted even though visual acuity is better than 6/60.

1.7 Muscle balance refers to the correct alignment of the two eyes. It is abnormal in such conditions as strabismus (squint) and nystagmus (rapid involuntary movements of the eyes). Often with imbalance of eye muscles the images form on non-corresponding areas of retina and this produces diplopia, i.e. double vision.

1.8 For administrative purposes a more precise and standardised definition of blindness for the guidance of certifying ophthalmologists is necessary and each country has developed what may be called an administrative rather than a legal or statutory definition of blindness. In Australia the administrative definition states that in order to qualify for benefits as a blind person "an applicant's visual acuity according to Snellen's Test Types after adequate correction by suitable glasses must be less than 6/60 in both eyes provided that there are no collateral defects" (Australian Department of Social Security Pensions Manual, Section 4.8).

1.9 Blindness may also be defined in terms of ability to work. The statutory definition of a blind person under the United Kingdom National Assistance Act (1948) is a person who is "so blind as to be unable to perform any work for which eyesight is essential" (Vernon, 1972, p.41) and under the Commonwealth Social Services Act (1947, Section 41) a person who is "permanently incapacitated or blind".

1.10 The Association for the Blind of Western Australia has developed an eye certificate consistent with the percentage of vision definition. It is used by Western Australian ophthalmologists for the referral of patients to the Association and the production of this certificate by a visually impaired applicant is helpful in achieving a "blind" pension. No means test is applied. A copy of the certificate is included in Appendix 2.

1.11 One further concept needs some explanation. Residual vision is a term used to describe the degree of functional vision in persons whose vision is severely impaired. Examples of this are awareness of light direction, ability to discriminate day from night, awareness of shadows, perception of large blurred objects, colour discrimination, central vision only, peripheral vision or part thereof, clouded vision, blotched vision, wavering vision and extreme myopia (near sightedness). Persons who have been classified as blind for administrative purposes may still have some residual vision.

Educational Issues

1.12 It is modern practice to base educational recommendations for a child with impaired vision on a detailed assessment of all the factors which may handicap a child in school. A complete medical examination is essential and a range of professional advice is needed to ensure that all the visual and non-visual factors are given full consideration in a decision to place a child in a particular educational programme. Not all the professions may be needed in each case, but those often involved include general practitioners, school medical officers, paediatricians, ophthalmologists, teachers, educational psychologists, educational audiologists and social workers.

1.13 The term visual handicap in this context has educational implications and refers to a disability in visual functioning that necessitates some form of special education. Barraga's (1976) definition has been adopted throughout this report.

> A visually handicapped child is one whose visual impairment interferes with his optimal learning and achievement unless adaptations are made in the methods of presenting learning experiences, the nature of the materials used, and/or in the learning environment (p.16).

1.14 Research and practical experience have shown that a visually impaired person is not always disabled or handicapped. Many children with visual impairments do not require special education. The purpose of special education is to make and support efforts to minimise the effects of the more severe impairments, to equip the student with alternative means of functioning and to try to ensure that the student adapts to the handicap. A visually impaired child can learn to function more effectively if provided with appropriate aids and instruction in a special learning environment. Thus a child who is totally blind and taught braille will be less handicapped than a totally blind child who is unable to use braille. The visually impaired person who is unable to drive a car will be less handicapped if taught to use public transport. The visually impaired child who has had mobility training will be less restricted in the wider environment than the child not given such instruction.

1.15 The terms partially-sighted, partially seeing, low vision and partially blind have all been used in educational contexts. They refer to children who, though handicapped to the degree that they cannot profit from regular schooling, are able to learn by sighted methods if adaptations are made to overcome or to minimise their visual impairment. Classes for the partially sighted have been established in most educational systems. It has been the practice to separate the blind from the partially sighted because different kinds of educational programmes have been thought desirable for these two categories of handicap.

1.16 Because different facilities are provided for children with severe impairment who must be taught by braille methods and those who can be taught by sighted means, the term blind in this report will be used to refer to visually impaired children who

primarily use braille and the term partially sighted to refer to children who primarily read large print, or regular print under special conditions. The terms braille reader and print reader are sometimes used, but these may be confusing because some braille readers learn to read print, some children progress best by using both print and braille materials, and some children with additional impairments may learn primarily through listening.

CHAPTER TWO

HISTORICAL REVIEW

2.1 The first institution providing education for visually handicapped children was opened in Western Australia in 1897. In that year the Royal Western Australian Institute for the Blind was built at Maylands as a permanent memorial to the Diamond Jubilee of Queen Victoria. From the beginning, one of the aims was to provide an efficient primary education for blind children and to give pre-vocational training in the very limited areas of employment available to blind people at that time.

2.2 Children whose sight was so inefficient that they could not be taught by ordinary methods in their local schools were also eligible for admission. In addition to the normal curriculum the children were taught typewriting, industrial work, instrumental and vocal music, and special attention was given to physical exercises. As was the universal practice at the time, most metropolitan and country children boarded full-time. After the age of sixteen, students could continue in the workshop at the Institute. Regular Government grants were made to the Royal Institute for the Blind in recognition of its work in the education of blind students. In 1950 the Education Department made its first direct contribution to the education of blind students by appointing a Departmental teacher to the Institute.

2.3 In 1953 the Western Australian Government consultant ophthalmologist, Professor Ida Mann, examined children attending the Royal Institute School to ascertain whether any of the children had sufficient

vision to be educated by sighted methods. Of the twenty four children examined, nine were classified as blind, seven as suitable for partially-sighted classes, five as suitable for normal education if corrective surgery were performed, and three as intellectually handicapped (Special Education Branch File 2001). As a result of Professor Mann's report the Education Department converted two rooms at the Thomas Street Primary School for the accommodation of partially sighted children. Provision was also made for the special training of two teachers who were to teach these classes (Education Department Annual Report 1953).

2.4 Prior to this time it was considered that the limited vision of partially sighted children would be further damaged by the use of sighted methods of learning. These children had been taught with legally blind children in an attempt to "conserve" or to "save" their sight. The decision to transfer partially sighted children from the Maylands Institute school reflected an overseas trend from an emphasis on the conservation of sight to an emphasis on improving visual ability in a structured visual environment. In this new situation visually handicapped children were encouraged to make maximum use of their residual vision.

2.5 In the United Kingdom, a real differentiation in the methods of teaching the blind and the partially sighted was made for the first time in 1907 when the London County Council provided instruction in reading and writing using large print for children who suffered from high myopia (Vernon, 1972). In Western Australia separate classes for the education of partially sighted children by sighted methods were not established until 1954 (Education Department Annual Report, 1954).

2.6 When the Thomas Street classrooms were opened in November 1954, ten partially sighted children were enrolled. At about the same

time, the blind children and those classified as partially sighted and intellectually handicapped were transferred to classrooms at the Maylands Primary School. The plan to transfer both of these groups to normal schools was applauded in the 1963 Education Department Annual Report as "a major advance in handicapped education" (p.21).

2.7 After the classes for the partially sighted had been operating for a year Professor Mann reviewed the children and reported to the Public Health Department. She made recommendations regarding curriculum and the need for more special equipment, and stated that there had been no deterioration in the sight of any of the children as a result of being taught by sighted methods. In fact the visual acuity of some children had improved (Special Education Branch File 2001). Three years after the blind children had been moved to the Maylands Primary School it was stated in the Education Department's Annual Report that the blind children "share in all the social activities of the Maylands Primary School, where they are fully accepted members of the school community" (Education Department Annual Report, 1956, p.27).

2.8 At the beginning of 1967, the blind children were moved from the Maylands Primary School to a specially designed classroom wing at the Primary School, Sutherland Street, Dianella. Parent counselling was undertaken by the staff of the Centre, and some pre-school activities were initiated. In 1974 the Centre was enlarged by adding a pre-school centre and a small flat. The flat has been used for social training and as a short term accommodation unit for parents from country areas.

2.9 Pre-school children attended the Centre for sessions which varied according to their needs. These sessions have normally been supervised by the teacher in charge of the Centre who

organised activities to fit in with other commitments. It is now the practice for the sessions for pre-school children to be conducted in the afternoons.

2.10 The classes for partially sighted primary students continued at the Thomas Street School until the end of 1976. In 1977, new classes for partially sighted children were established at Nollamara Primary School and Lathlain Park Primary School. The provision of these duplicate facilities in different areas was intended to reduce the long travelling time which was inevitable for some children when only one such facility was available.

Secondary and Tertiary Education

2.11 Prior to 1950 when the Education Department first became directly involved in the education of the blind, only three students had matriculated. Two students of the Western Australian Institute for the Blind, Miss Joan Lowensohn and Mr Harold Ackland were appointed as pupil teachers at the school in 1918. In 1922 they were relieved of their duties so that they might attend Stott's Business College. Both matriculated and proceeded to the University of Western Australia. During her first year at the University Miss Lowensohn returned to the Institute School and resumed teaching. She transferred with the students when the school was moved to the Maylands Primary School in 1954 and continued teaching there until her retirement in 1966.
Mr Ackland completed a Bachelor of Arts degree, and, after two years working for the Braille Society, became the travelling sales representative for the Industrial School for the Blind until his retirement in 1967. In 1943 another blind student, Mr John Henshaw, gained the Junior Certificate by studying through

the medium of correspondence lessons under the supervision of a teacher at the Royal Institute for the Blind. Subsequently he attended Wesley College and matriculated. He was awarded a Bachelor of Laws degree by the University of Western Australia in 1948.

2.12 In 1950 only twenty six per cent of all children in Western Australia continued at school beyond Year nine. Table 2.1 indicates the increase in the percentage of Government school students completing up to five years of secondary education since 1950. The change has been substantial and more students now stay on past the statutory school leaving age of fifteen years. As will be demonstrated later in this chapter, some of these are visually handicapped students.

TABLE 2,1

Percentage of Year 7 Students Completing Succeeding Levels of Secondary School

	Year 8	Year 9	Year 10	Year 11	Year 12
1950	90	54	26	5	5
1961	99	86	62	18	14
1976	97	95	88	44	28

Based on figures supplied by the Planning Branch, Education Department of Western Australia. Base: Year 7 = 100%

2.13 The Education Department's Annual Reports from 1950 on refer to difficulties experienced by teachers of the blind in providing for the range of ages, abilities and attainments of students enrolled in their classes. Secondary education is not mentioned until 1961 when it was reported that one boy attending the Maylands Primary School was pursuing a Correspondence School secondary course (Education Department Annual Report, 1961). In 1963 it was noted that one boy was attending high school and was working

towards the Junior Certificate examination (Education Department Annual Report, 1963), but by 1968 nine students were attending regular high schools (Education Department Annual Report, 1968). In order to provide extra tutoring for these students a part-time teacher was appointed to make weekly visits to the schools.

2.14 In 1971 a significant number of blind secondary school students was living in the Morley and Dianella areas. As six blind students were commencing Year eight, it was decided to establish a resource room for blind students at the Morley Senior High School. A part-time teacher was appointed to help the students and the room was equipped with material provided by parent and service groups. The itinerant teacher service continued for those students who chose to attend their local Government high schools or independent secondary schools. Provision was made for secondary school students, whose vision deteriorated to the extent that they were obliged to learn braille, to transfer to the Sutherland Street Blind Centre. When their level of competence was assessed as adequate they returned to a regular high school with itinerant teacher support. This procedure has continued up to the present and there is a more detailed discussion of this matter later in this report.

2.15 Few Western Australian blind students received any formal post-secondary education until recently. So far as it has been possible to ascertain no more than seven students educated by braille methods at school have completed tertiary qualifications in the eighty years from the opening of the Royal Institute for the Blind. The first higher degree (Master of Education) awarded by the University of Western Australia to a student who has been educated at a school using braille methods was conferred on Mr Keith Hayes in April 1977 (The West Australian, 29th April, 1977).

2.16 The number of blind students undertaking secondary and tertiary education has steadily increased. In November 1977 four blind students were studying social work at the Western Australian Institute of Technology full-time, one was studying journalism part-time and one was studying sociology part-time. One blind student was enrolled in the first year of studies leading to a law degree at the University of Western Australia.

CHAPTER THREE

THE EDUCATION OF THE VISUALLY HANDICAPPED IN WESTERN AUSTRALIA

3.1 In 1977, seventy Western Australian children were being educated in special classes for the visually handicapped or were receiving special help in regular classes. Of these seventy children thirty-eight were classified as blind and thirty-two as partially sighted. Nineteen of these children had additional handicaps, but these were not significant enough to detract from the value of educating the children in special classes for the visually handicapped.

3.2 Table 3.1 shows the distribution of these students at the pre-school, primary and secondary levels.

TABLE 3.1

Children in Classes for the Visually Handicapped

Educational Level	Without Other Handicaps	With Other Handicaps	Total
Pre-school	5	5	10
Primary	33	11	44
Secondary	13	3	16
Total	51	19	70

3.3 In addition to the seventy children referred to above, there were in Western Australia in 1977 between sixty and seventy multiply handicapped children with visual impairment who required alternative specialised services. These children were receiving care, training and education in therapy groups, day activity centres and hostels for the intellectually handicapped, or were attending special schools for the deaf, the intellectually or physically handicapped.

3.4 Many of these multiply handicapped children have other severe impairments and the provision of appropriate care for them is a very important consideration. Because of the special needs which these children present, the Council has decided not to deal with their needs in the present report but to consider them at a later time. Our discussion in this report will be focused on the education of the seventy visually impaired children listed in Table 3.1.

3.5 Table 3.2 shows the number of children receiving special education for the visually handicapped in Western Australia in 1977. There were twenty-eight children at the Sutherland Street Blind Centre. Twenty-six children attended the print instruction classes at Nollamara Primary School (14) and at the Lathlain Park Primary School (12). Six attended the Morley Senior High School and ten attended other secondary schools.

3.6 The sixty primary and secondary students who were receiving special education for the visually handicapped in 1977 represented 1.5 per cent of the 4,000 children who were receiving special education in Western Australia, and only 0.024 per cent of the total school population of approximately 250,000 students in Government and non-Government schools.

TABLE 3.2

Numbers of Children Receiving Special Education for the Visually Handicapped in Western Australia in 1977

School	Administratively Blind					Partially Sighted		Total
	Totally Blind	Totally Blind/ Other Handicap/s	Residual Vision	Residual Vision/Other Handicap/s	Residual Vision/ Other Handicap/s Not Using Braille	No Other Handicap/s	Other Handicap/s	
Sutherland Blind Centre								
In contact with pre-primary programme		1	2					3
Attending pre-primary programme	2	4	1					7
Primary	3	2	5	8				18
Primary Classes								
Nollamara Primary School						14		14
Lathlain Park Primary School						11	1	12
Secondary Classes								
Morley Senior High School		1	3	1	1			6
Other High Schools								
- Government			4			3	1	8
- Non-Government						2		2
TOTAL:	5	8	15	9	1	30	2	70

3.7 Table 3.3 shows recent estimates from England, Scotland and the United States. Each of the overseas sources cited stresses the difficulty of arriving at these estimates because of different methods of classifying blindness and partial sight, and also because of different patterns of school organisation in each country.

TABLE 3.3

Incidence of Blind and Partially Sighted Children
Numbers Per 1,000 of Total School Population
England, Scotland, U.S.A.

Country	Blind	Partially Sighted	Source
England	0.137	0.266	Vernon, 1972, p.6
Scotland	0.250	0.750	Scottish Education Department, 1969, p.23
United States of America	0.200	0.800	Harley, 1973, p.421

3.8 Table 3.4 indicates the number of children in Western Australia classified as visually handicapped who received special education in 1958 and 1977. It is possible that the overseas estimates are higher than the Western Australian figures because some residential schools for the blind in the United Kingdom and in the United States enrol multiply handicapped children, whereas most similar severely handicapped children in Western Australia are supported in facilities other than the Blind Centre, special classes for the partially-sighted or regular high school.

TABLE 3.4

Incidence of Blind and Partially Sighted Children
in Western Australia
Numbers Per 1,000 of Total School Population

Year	Blind	Partially Sighted	Source
1958	0.100	0.180	Garnett, 1958, p.61
1977	0.116	0.124	Special Education Department files

3.9 Because of the lack of accurate epidemiological data and the changing standards of identification and assessment, it is difficult to predict future changes. However, it appears unlikely that there will be a sudden increase in the number of children requiring special education because of visual handicaps. It appears more probable that there will be a slow increase commensurate with the growth of population. Research and further medical knowledge may lead to the prevention or cure of some forms of visual impairment. It is also recognised that sudden increases in particular forms of visual impairment may occur at any time. An example is the discovery in the 1950's of the relationship between the administration of excessive oxygen to prematurely born children and the increase in cases of retrolental fibroplasia. Because of this discovery, medical intervention has made possible a reduction of visual defects from this cause.

3.10 The future effect of the development of electronic devices (such as closed circuit television and magnifying instruments) could have a great impact on the education of visually handicapped children, enabling some to use print rather than braille methods.

3.11 Using the present numbers as a basis it appears that there will not be sufficient children to warrant a special centre for the education of the visually handicapped in any place outside the Perth metropolitan area in the immediate future. The Council recognises that this will pose problems for parents living in country areas. At the present time parents have to decide either to move to Perth with their families or to allow their visually handicapped child to board away from home in order to take advantage of the special education facilities available in Perth. These problems are discussed more fully in Chapter Four.

Pre-School Training Programmes

3.12 An early education for visually handicapped children has been recognised in Western Australia as having priority, and a special pre-school training programme is provided at the Sutherland Street Blind Centre. Regardless of age, once visual impairment has been diagnosed, children may be enrolled in the special programme. The Centre aims to prepare children where possible for integration into the kindergarten or pre-school and to assist and advise their parents. Some children remain at the Centre's kindergarten and others return after training to a regular kindergarten or a pre-school class but continue to attend the Blind Centre for pre-braille instruction.

3.13 This special programme includes movement and mobility activities, body awareness, self-image concepts, sensory development, tactile discrimination, manipulative skills, and daily living activities. Parents receive counselling and instruction in how to continue programme activities at home, and may commence learning braille if they wish to assist their children in learning this skill.

3.14 The Centre's special programme is not restricted to those children who may require a braille education, but is also open to visually handicapped children with multiple handicaps who may be attending other institutions.

3.15 Partially sighted children may also attend the Centre if it seems that the programme will meet their developmental needs. However, as a visual impairment may not start to become a handicap until school work makes increasing demands on near vision, many of the children who eventually attend partially sighted classes are not referred for special education until after they have attended a regular school for a time.

3.16 Parents of visually handicapped pre-school children from country areas may attend the Centre for educational advice at any time and stay at the flat attached to the Centre. Although the majority of these parents appear to prefer to travel to Perth by car, free rail travel is available to blind children to attend the Centre and an accompanying adult may travel at half fare. Such parents may also obtain written advice at any time from the teacher in charge.

Primary Education

3.17 As noted previously, classes for primary school pupils with impaired vision are located at three metropolitan primary schools. Of these, braille is taught only at the Sutherland Street Blind Centre. The ages and abilities of the children at the Centre vary greatly, for in addition to the children who attend for all of their primary schooling, children whose sight deteriorates later may enrol for braille tuition at any age.

3.18 Primary school children so affected remain at the Centre until they transfer to a high school, and children of high school age remain for varying periods until it is considered they can function effectively in a regular high school.

3.19 Each child therefore follows an individual programme. Not all the children at the Centre are taught primarily by braille methods. Some are able to use large print materials and do so. In addition to learning basic literacy and numeracy skills, each child also studies combinations of additional subjects which must be specifically taught to the blind. These include: braille technique, braille reading, braille writing, braille transcription and braille mathematics code; touch typing and audio-reading; intensive programmes in body awareness and movement, spatial concepts and terms, orientation terms, mobility, sensory development (tactile, auditory, gustatory and olfactory); personal hygiene, grooming and self-care, social skills and eating habits, and daily living skills such as cooking, cleaning, housekeeping, sewing and repairs.

3.20 The Centre is staffed by three trained teachers. Two are on the permanent staff of the Education Department and one is employed on a temporary basis. One of the permanent teachers holds the Diploma of the Australian and New Zealand Association of Teachers of the Blind. Three part-time aides and a part-time braille transcriber are also employed. Special physical education for the pupils at the Centre is given by a specially qualified physical education teacher at the Tuart Hill Senior High School, and special orientation and mobility training is given by an orientation and mobility instructor from the Association for the Blind who attends the Centre regularly. Integration of pupils at the Centre with pupils attending the Sutherland Street Primary School appears to be limited to informal playground inter-

action. Some of the children from the centre have participated in the local school athletic sports. No child from the Centre attends any formal classes at the school.

3.21 Classes for the visually handicapped using ink print instruction methods are located at Nollamara Primary School and Lathlain Park Primary School. Print instruction is either by means of large print material, or by using normal print material with the aid of magnifiers. Specially designed desks are provided and attention is paid to the provision of good lighting conditions. In addition to the normal curriculum, students are given special instruction in typing and the use of audio-visual aids.

3.22 At both schools all special education students are regarded as members of the school community and positive integration into normal school activities is implemented when appropriate. As children from the partially sighted classes may return to their regular school if it is considered that they have developed sufficiently to enable them to progress effectively, integration into normal classes may take place at their own neighbourhood school rather than at either Nollamara Primary School or Lathlain Park Primary School.

3.23 At both Nollamara Primary School and Lathlain Park Primary School a trained teacher is in charge of each of the classes for partially sighted children. In each school, the services of a part-time aide are available if required.

3.24 Blind and partially sighted children from country areas must board in Perth if they wish to attend one of the special classes for the visually handicapped or the Sutherland Street Centre. Two forms of arrangement have been used. Children may board at the Royal Institute for the Blind. Despite the positive efforts of the Institute's staff, such a placement may be unsuitable for children of school age since the other

residents in the Institute are adult and many are of advanced age, thus limiting the chance visually handicapped children should have of learning to live in a normal family situation. The very small number of children who need to board precludes the Institute from developing a unit which could provide a programme for interaction with other children and adults such as can be provided at the W.A. School for Deaf Children.

3.25 Children may also board with private families. This is considered more desirable by those concerned with the education of visually handicapped children. During 1977 only two children who were attending special classes in Perth were boarding, one at the Institute and one with a private family.

Secondary Education

3.26 All visually handicapped students of secondary school age who are not enrolled in other special education facilities attend regular high schools and receive special support from the Special Education Branch. Two forms of support are available.

3.27 At Morley Senior High School there is a resource room staffed by a full-time teacher. The role of the teacher working in the resource room is supportive rather than instructional. She is available to advise teachers new to the school on any modifications in the classroom which may be helpful to a visually handicapped student, to confer with teachers and students on any classroom problems, and to make arrangements for the brailling, taping and reading of materials needed by students. The resource room operates as a centre where students may work in free study periods and as a place for storing their special braille materials. Visually handicapped students from any part of the metropolitan area may attend this school.

3.28 The Education Department employs a part-time itinerant support teacher who visits those visually handicapped students in the metropolitan area who choose to attend other secondary schools. The support services of the itinerant teacher are also available to any visually handicapped student attending a country high school. The support provided includes a preliminary visit to a school before a student enrols and the giving of advice and information to teachers regarding any programme modifications which may be necessary or desirable. The teacher also explains the use of equipment such as the Perkins Braillers, and acts as a liaison between the student and the teacher when problems arise. The itinerant teacher's responsibilities also include making sure that brailled and taped materials are available to students when they are required.

3.29 Visually handicapped students are not limited to courses in which brailled materials are already available. When new courses are being introduced, the Association for the Blind arranges the transcription of materials requested by the resource teacher and the itinerant teacher, and production costs are met by the Education Department. Not all subjects available at secondary level have been studied by visually handicapped children, but this reflects the small number of such students and their individual preferences.

3.30 The majority of visually handicapped students who have attended secondary schools have made satisfactory progress and some of these students have achieved levels regarded as above average, even for sighted students. Data showing subjects taken and attainment levels reached by visually handicapped students have not been included in this report because this could lead to the easy identification of individual students. Some of the visually handicapped students in secondary schools may be a year

or more older than other students in the classes they attend. This situation does not necessarily reflect lack of ability or poor teaching, but rather such factors as educational retardation caused by hospitalisation, delay in making the decision to change to braille when sight deteriorated, or re-adjustment to sudden adventitious blindness.

Post-Secondary Education

3.31 More visually handicapped students are enrolled in post-secondary courses at the present time than ever before. However, not all students who have completed post-secondary courses have obtained employment commensurate with their qualifications, and in the current unemployment situation some graduates have experienced problems.

3.32 The Association for the Blind is the main supporting agency for students studying post-secondary courses. Some of their curriculum material is brailled, but the volume of reference reading required at colleges of advanced education and at universities means that visually handicapped students must rely very heavily on personal readers and on taped materials.

3.33 All post-secondary institutions are becoming aware of the increase in enrolments of handicapped students, including visually handicapped students. Arrangements for giving assistance vary but where counselling services are well-established these services attempt to publicise the fact that staff are prepared to help and expect the individual student to seek help when it is needed.

3.34 In general, there appear to be few barriers preventing visually handicapped students from enrolling in most post-secondary courses. However, tradition and the limitations of future employment have tended to channel the few graduates into those vocations wherein visually handicapped adults have already succeeded.

CHAPTER FOUR

RECOMMENDATIONS

4.1 This final chapter is concerned with recommendations for changing the present system of educational services for visually handicapped children. The recommendations which follow arose out of the Council's deliberations following consultations with various individuals and organisations.

4.2 In general the Council was favourably impressed with the standards of teaching and with the provision of special education services to these students.

Co-ordination Among the Australian States and Territories

4.3 The Council believes that some arrangement to facilitate co-operation among the Australian States and Territories would be of mutual advantage to all, particularly if it facilitated the exchange of brailled, taped and other audio-visual aids. In this way information and teaching materials related to the education of all visually handicapped children in Australia could be pooled and made available to all State Education Departments. The number of visually handicapped children being educated in primary and secondary schools in Western Australia is too small to justify the establishment of an independent library and reference centre.

RECOMMENDATION 1: The Minister for Education should recommend to the Australian Education Council that it consider establishing a centrally co-ordinated library and reference centre to serve all Australian States and Territories.

The centre should include:

i. Information about, and copies of, brailled material prepared for student use such as textbooks and reference material.

ii. Information and copies of audio-visual material prepared for student use and teacher information.

iii. Information about Australian and overseas research, and evaluation of technological aids for the visually handicapped.

iv. Information about the education of visually handicapped children so that a current list of schools and programmes would be readily available.

Appointment of an Education Officer

4.4 At the present time there is no specific Education Department officer to overview and to administer educational programmes for the visually handicapped. Even though the number of students involved is small the Council believes that the appointment of such an officer is justifiable. The duties of this officer would include:

i. Co-ordination of all educational services for the visually handicapped in schools.

ii. Co-operation with all other agencies involved in the education of the visually handicapped.

iii. Counselling of parents.

RECOMMENDATION 2: The Education Department should appoint an Education Officer to be responsible throughout the State for all educational services for the visually handicapped. This officer should be directly responsible to the Superintendent of Special Education.

Integration of Special Classes into the Schools

4.5 Special Classes for visually handicapped students are located in Lathlain Park, Nollamara and Sutherland Street Primary Schools, and in Morley Senior High School. The principle of integration has been stated and supported by the Council in its previous reports.

4.6 The Council supports strongly the statement by the Australian Special Education Heads in the Report of their Second Biennial Conference in 1976, that there should be "maximum useful association between handicapped children and others consistent with the interests of both" (p.5).

4.7 The Council believes that students in the Special Classes for the visually handicapped in these four schools should be integrated into normal classes as fully as possible. It also supports the principle that all teachers in these schools have a responsibility to plan and work towards this end.

RECOMMENDATION 3: The Education Department should pursue a policy of encouraging the maximum useful association of visually handicapped students with other students in its schools.

Sutherland Street Blind Centre

4.8 The Council believes that if the education of blind children is to continue at the Sutherland Street Primary School the Blind Centre should be a part of the school, with the Centre under the control of an additional qualified deputy principal who would be directly responsible to the Primary School principal. In this way the Centre would be an integral part of the school's organisational pattern. Under this proposal the deputy principal would organise the Centre and continue the present programme with the support both of the Primary School principal, and of the Education Officer. In the longer term the need of children to be educated close to their homes must receive continuous consideration.

RECOMMENDATION 4: The Education Department should appoint an additional suitably qualified Deputy Principal to be in charge of the Sutherland Street Blind Centre and this officer should be directly responsible to the Principal of the Sutherland Street Primary School. Notwithstanding this recommendation, the Education Department should pursue the policy of regionalisation recommended in previous reports.

Pre-School Facilities at the Sutherland Street Blind Centre

4.9 In 1977 the Sutherland Street Blind Centre catered for twenty-eight visually handicapped children aged from one year to sixteen years and of these ten were of pre-school age. It is the opinion of the Council that better provision should be made for the needs of pre-school visually handicapped children

who visit the Centre, and also that there should be more time to allow home visits by a teacher to advise the parents of pre-school visually handicapped children, whether such children visit the centre or not.

4.10 The Council suggests the provision of a regular morning educational programme for those children at the Centre, with the afternoon available for the pre-primary teacher to conduct a systematic programme of home-based educational counselling. The Council strongly believe that there is a requirement to provide an improved educational programme for pre-school visually handicapped children as soon as the needs of the children have been assessed.

RECOMMENDATION 5: A suitably qualified and experienced pre-primary teacher should be employed at the Sutherland Street Centre, both to conduct a programme for visually handicapped children each morning and to develop a home-based educational counselling programme to complement the Centre's school-based programme.

The Employment of a Social Worker

4.11 Parents of visually handicapped children have a need for counselling and help with problems other than those of a purely educational nature. A number of agencies provide trained social worker aid for such parents. During the years visually handicapped children are attending school, the school is an appropriate place for the provision of primary individual and group social worker support.

RECOMMENDATION 6: The Education Department should ensure that its social workers have the primary responsibility for providing services for visually handicapped students and their parents.

Braille Training for Newly Appointed Teachers

4.12 The Education Department has not required teachers of the visually handicapped to have any special qualification or training prior to transfer to this area, and it has been possible for teachers to commence teaching visually handicapped children without any prior training or experience with exceptional children. Since courses in special education are now available in Perth, the Education Department should be able to appoint a teacher of the handicapped with training in this area. After appointment, teachers may work towards the Diploma of the Australian and New Zealand Association of Teachers of the Visually Handicapped but there is no compulsion to do so and the diploma is not recognised formally by the Education Department.

4.13 It has been the case that teachers have been transferred to teach the reading of braille to children without the teachers themselves being able to read braille. It might be thought that as transfer to an area of special education is voluntary and attracts a special allowance in Western Australia, it would be expected that the teacher should learn braille before taking up duties. However, unless the teacher is released from teaching to study braille prior to taking up an appointment this is not generally feasible. The Council has been informed that a month's full-time tuition before commencing duties could be enough to ensure that a teacher had a sufficient knowledge of braille to teach in the students' mode of written communication.

RECOMMENDATION 7: All teachers who are to work with students using brailled materials should receive an adequate preliminary training in braille before taking up an appointment. It is also recommended that teachers be given regular in-service training so that they may improve their skills in this area.

Provision for Secondary Students

4.14 At the present all braille training is given at the Sutherland Street Blind Centre, which is located in the Sutherland Street Primary School. The Council has some concern that secondary students feel they are being demoted to a primary school environment to receive such training, and believes that consideration should be given to alternative means of meeting the needs of secondary students whose vision deteriorates. Placement decisions will depend on the individual student's needs and abilities but it seems apparent that a pattern of intensive individual tutoring and training could be more beneficial for some students.

RECOMMENDATION 8: The Education Department should investigate and implement alternative methods of training students who lose their sight during adolescence, and arrange a programme that does not necessarily involve transfer to a primary school.

Referral, Diagnosis and Assessment

4.15 A large number of individual professionals, Government Departments and voluntary agencies have become involved in the initial and continuing referral, diagnosis, assessment and treatment of children with visual handicaps, especially if there are additional problems. Some indication of this is given by the list below. Some children and their parents may have contact with a limited number of those categories listed, but others may have contact with most of these categories at various times.

Individual Professionals. General practitioners; medical specialists such as ophthalmologists and paediatricians; orthoptists (concerned with remedying eye muscle defects); and ocular prosthetists (concerned with making artificial eyes).

State Government Departments. Infant health sisters; school doctors; school nurses; psychologists; social workers; child health specialists; physiotherapists; occupational therapists; advisory teachers; teachers of the visually impaired; educational audiologists; ophthalmologists; and speech therapists. These personnel may work for the Education Department; for the Public Health Department's Child Health Service, or its School Medical Service; for the Mental Health Services' Division for the Intellectually Handicapped; or for particular institutions such as the Sir James Mitchell Spastic Centre.

Federal Government Departments. Audiologists employed by the Department of Health's National Acoustic Laboratory.

The Association for the Blind of Western Australia. Welfare officers and orientation and mobility trainers.

Princess Margaret Hospital. Medical specialists; speech therapists; physiotherapists; psychologists; occupational therapists; nurses; and social workers.

4.16 Despite the wide range of services available, the Council noted the opinion of professionals dealing with children with impaired vision that on the one hand some parents and children may not be receiving services which are available, and on the other hand some parents and children may be receiving conflicting advice and too many services at the one time.

4.17 The Council believes there is a strong case to provide children and their parents with one contact point where there is adequate counselling related to the range of services available.

RECOMMENDATION 9: The Education Officer for the Visually Handicapped should counsel children and their parents and act both in an advisory and in a co-ordinating role.

Braille Transcription of Educational Materials

4.18 All transcription of secondary school materials is performed by volunteer transcribers working for the transcription service operated by the Association for the Blind. The Education Department's contribution to the brailling of instructional material is for the cost of the special paper and binders. For the period 1st January 1974 to 31st October 1976, this cost amounted to about $3,075, which represented an average cost of approximately $100 per student per year.

4.19 A print book becomes many volumes in braille, and textbooks are transcribed into master copy form. This means that sheets of paper are brailled on one side only, and the student receives a thermoformed copy. The thermoform machine employes a simple heat and suction process to produce one copy at a time of the original braille sheet on a special synthetic sheet called braillon. The master copy is kept unbound in the library, ready for other copies to be made if necessary.

4.20 The students' braillon volumes are returned to the library at the end of the year and stored for future use.

4.21 In any one year, the students' book lists will be made up from standard manilla volumes, braillon copies already in stock, new braillon copies from existing masters, and new braillon copies of newly-transcribed titled.

4.22 The following table shows the amount of transcription and copying work for the period 1974 to 1977, and this represents at least 13,800 hours of brailling by voluntary transcribers.

TABLE 4.1

Transcription Service for Schools

Year	Number of Students	New Texts			Texts Copied from Existing Master Copies		
		Titles	Vols.	Braillon Vols.	Titles	Vols.	Braillon Vols.
1974	8	44	178	185	13	178	95
1975	13	69	260	283	21	72	172
1976	10	26	146	238	16	65	79
1977	10	30 + 4 on tape	90	140	4	8	12

N.B. Morley Senior High School keeps braillon volumes known to be required in the following year.

4.23 Table 4.2 shows both the number of titles and volumes lent to students in 1975, 1976 and 1977.

TABLE 4.2

Total Material Lent to Students

Year	Number of Copies of Titles	Volumes
1975	187 (including 35 maths texts)	856
1976	72 (including 25 maths texts)	469
1977	100 (including 28 maths texts)	385

4.24 Books represent only part of the material which is transcribed. Equally important is the brailling of class hand-outs, tests, examination papers and single articles from books, magazines and newspapers. Whereas brailling of texts may be organised on a relatively long-term basis and performed by transcribers anywhere in the State, the overall efficiency of students' education is dependent to a large extent on prompt brailling of non-text materials on a day-to-day basis. At present this type of transcription is performed by a retired teacher of the blind who receives a small attendance allowance in return for being available at the Association's library on what is a virtually full-time basis.

4.25 The Council believes that there is a need to fund and to provide a full-time educational braille transcriber, especially to help cope with the day to day needs of secondary school students and of tertiary level students.

RECOMMENDATION 10: The Minister for Education should arrange for an assessment of an appropriate financial grant to the Association for the Blind of Western Australia for the adequate braille transcription of educational materials.

Storage of Educational Materials

4.26 The arrangements for the provision of brailled materials for students are reasonably satisfactory, and were improved in 1976 when a part-time transcriber was appointed to the Sutherland Street Blind Centre.

4.27 All brailled educational materials are on loan to students and are returned to the Association for the Blind Library when no longer required. The Library must also store all texts over

the long vacation and provide year-long storage for full sets of texts for courses which have been taken by former students but which are not currently being used. The amount of these materials is constantly increasing and is taxing the storage space available.

4.28 As the centralisation of the educational transcription service at the Association's Library is an important factor in its efficiency, and as the brailled texts are used by secondary students, we consider that this contribution by the Association for the Blind to the education of visually handicapped students should be funded by the State Government.

RECOMMENDATION 11: The Minister for Education should arrange for assessment of an appropriate financial grant to the Association for the Blind of Western Australia to assist it to increase the space available to store educational materials.

Large-Print Books

4.29 One means of teaching visually handicapped children who cannot read normal print but whose handicap is not considered severe enough for them to be taught by braille methods is by the use of large-print books. This method is restricted by the small number of titles commercially available in large print. In the lower grades many school books, and books for free reading, are printed in large type but little large-print material is available for middle primary and older students. Increasing numbers of titles are being published in large print for adults but are only of limited supplementary use for older students. Some special education systems attempt to overcome the problem of

of obtaining their exact requirements by investing in enlargers and offset litho copying equipment (Vernon, 1972), microfilm duplication and enlargement equipment or by hand production using volunteer typists at large-print typewriters (Harley, 1977). The Special Education Branch of the Education Department has investigated the copying of materials in Perth but decided that, because of the small numbers of children involved and their very individual needs, funds required for large print production could be better used in the provision of other types of equipment.

RECOMMENDATION 12: The proposed Australian central co-ordinated library and reference centre should copy and distribute large-print materials

Audio Recorded Materials

4.30 In the United States, increasing emphasis is being placed on listening as a means of providing information about the environment in special education programmes for visually handicapped children (Harley, 1973). The ease of use, robustness, low cost and ready availability of portable tape recorders is one reason for this emphasis.

4.31 Visually handicapped persons have always had to depend on listening as well as on braille and on large-print materials, but until the development of cheap portable tape-recorders these persons were dependent on a reader, such as a relative, teacher or friend being physically present. A very limited amount of material was available on disc recordings. The first Talking Books for the Blind were recorded on disc but it was not possible for teachers to make disc recordings. When tape recorders became available teachers still had to prepare much recorded material either by

reading themselves or by using volunteer readers, but once taped the material could be used again without the need for the teacher as an intermediary between book and student.

4.32 The American Printing House for the Blind has undertaken extensive research into learning by listening and the design of systems for learning by listening (Harley, 1973). The main advantage is that information can be gained at a faster rate without loss of comprehension. An English survey of braille readers showed that for the 17-18 years age group a rate of 100 words per minute could be considered fairly normal for narrative material requiring careful reading (Vernon, 1972). A similar rate has been reported for students reading large print (Harley, 1973). Although rates of learning by listening are slow compared with normal print reading rates, rates of 175-200 words per minute which have been achieved are much higher than those achieved using braille or large print.

4.33 Listening rate and efficiency can be improved with training, and by providing material recorded at a faster rate than normal speech. Two methods of accelerating recorded speech have been developed which can deliver speech at rates in excess of 275 words per minute. In one method the tape speed is increased, which normally results in a higher pitch, but the pitch is electronically returned to normal levels. The other method employs a sampling procedure to shorten selectively pauses and vowel sounds, while retaining the critical consonant sounds in their true duration. It has been found that compression beyond 275 words per minute results in a sharp decline in retention of information (Foulke, 1966). Compressed speech recordings are being used by tertiary students in Western Australia.

4.34 Although listening appears to be a more efficient way of learning for the visually handicapped than either braille or large print, (except for mathematical and scientific materials employing formulas, diagrams and tables) emphasis on teaching by this method must be balanced with the need for blind children to have facility with braille as the only medium in which they can write and read back what they have written.

4.35 In Western Australia at present all recording for visually handicapped students is prepared by teachers, volunteer readers co-opted by teachers, parents and volunteer readers at the Association for the Blind. Not all of these persons are experienced and trained in oral reading. The Council considers that the service to students could be improved if trained teachers were employed by the Education Department to prepare a large part of the material needed by visually handicapped students, thus releasing the readers at the Association for the Blind for more reading for the adult blind.

RECOMMENDATION 13: Additional resources should be made available to improve the provision of audio recorded materials for visually handicapped children.

Magnification Aids

4.36 For many partially sighted children magnification of normal print material is more useful and versatile than large-print material. The most common forms of magnification used with partially sighted children are spectacles and hand held magnifiers. More complex magnification projectors and back projection facilities to allow children to stand or sit very close to a screen are also used in

classrooms for partially sighted children. A more recent development has been the use of closed circuit television (C.C.T.V.) systems for producing magnified images of ink-printed material. Good images at very high magnifications are possible and it has been reported that some persons with vision as low as 2/60 have achieved reading speeds of 120 words per minute using C.C.T.V. equipment (Judd, 1976). An advantage of magnification by television camera and monitor is that the image can be inverted, i.e. white letters are seen against a black background so that glare is reduced. Overseas research with adults (Fonda et al., 1975) indicates that C.C.T.V. systems are not of universal benefit to all visually handicapped persons but can be of value to some people enabling them to develop skills in print rather than braille reading, increase reading speeds and decrease fatigue while reading. A portable system is at present being evaluated in Perth with secondary school visually handicapped students. The cost of importing commercial systems from the United States is high, the Visutec imported for the Special Education Department costing $1,700. It has been suggested that it would be possible to assemble suitable systems in Perth without infringement of commercial patents.

RECOMMENDATION 14: <u>The possibility of constructing specialist educational equipment in Australia should be referred to the proposed Australian central co-ordinated library and reference centre, and preliminary investigations should be conducted in Western Australia as soon as possible</u>.

Direct Print Reading Aids

4.37 For many years researchers have been attempting to develop a means whereby inkprinted material can be read by blind persons

without the aid of an intermediary reader or of a braille transcriber. A variety of instruments designed to convert print into tones, tactile arrays, spoken letters and synthetic speech have reached the prototype or production stage.

4.38 At present, the Optacon (OPtical to TActile CONverter) developed by Bliss and Crane in the 1960's and marketed by Telesensory Systems Incorporated of California appears to have gained widest acceptance. The basic user apparatus consists of a portable, battery-powered unit, about the size of a small cassette recorder, consisting of three integral parts: the camera module, the electronic section and the tactile stimulator array. The miniature camera, about the size of a pocket knife, contains 144 light-sensitive phototransistors. When the camera is passed over ink-print characters the phototransistors produce signals which are transformed into electronic impulses which activate 144 vibrating rods arranged in six columns and 24 rows on the tactile array. The rods vibrate in the shape of the print symbols which are felt by a finger of one hand as the other hand tracks the camera across the line of print. A number of modified camera attachments are available which can be used for reading from calculators, typewriters or cathode ray displays. Use of the Optacon requires good tactile discrimination, language skills and good two-hand co-ordination. Reading speeds obtained by Optacon users are not high. After a 50 hour training it is expected that speeds of 5-15 words per minute will be attained, and increases up to 90 words per minute can be obtained with further practice although top speeds of 50 words per minute are more likely. Despite the slowness of Optacon reading it offers advantages in independence to the blind person able to learn to use it as it overcomes the inevitable delays when the blind person must wait for printed material to be transcribed, read or recorded.

4.39 Originally most of the research in the development of the Optacon was conducted with adult subjects. It is not yet apparent whether children who have been taught to use the instrument in early school years will be able to develop accelerated reading speeds, nor is it certain that a higher proportion of visually handicapped children than adults can be taught to use the Optacon usefully.

4.40 Individual Optacons cost between $2,500 and $3,000 but in addition to the personal instrument described above, an instrument designed to assist in the development of tracking skills must be purchased as the basis for training programmes. The Association for the Blind of Western Australia acquired a training unit for demonstration and teaching purposes in 1976 and the Communications Officer of the Association undertook a training course in Sydney. During 1977 the Special Education Branch of the Education Department paid $9,000 to purchase a training unit and two individual Optacons.

4.41 At the present time it appears that electronic technology holds much promise for improving the education for visually handicapped people. It will become increasingly important for special education staff to obtain information from a variety of sources to assess the respective costs and advantages of various makes of instruments. It may be the case in some instances that the benefits claimed for a more expensive and widely publicised instrument may be obtained equally well from a less expensive instrument. A possible example came to notice during the Council's investigations for this report.

4.42 Both the Royal Western Australian Institute for the Blind and the Association for the Blind of Western Australia have recently purchased calculators which produce answers in the form of synthetic speech. The calculators are capable of only the

simple functions of addition, subtraction, multiplication and division and cost approximately $320. A report in the Daily News of 11th May 1977 described a calculator adaptation developed by a team in the School of Mathematics and Physics at Macquarie University. The team can adapt all types of calculator, simple and complex, to receive a small brass pin plate which gives readings in braille. The parts for the adaptation were said to cost approximately $16 in addition to the cost of the calculator and no charge has so far been made for labour. In addition to the adaptation of calculators two volt-meters have been adapted and the team is investigating the possibilities of adapting other industrial devices.

RECOMMENDATION 15: Until such time as the proposed Australian central co-ordinated library and reference centre is established the Education Department should continue its own investigations and maintain contact with personnel in other Australian States and overseas regarding the development and use of direct print reading aids.

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APPENDIX 1

Some of the more common causes of visual impairment classified according to the functional divisions of the visual system.

Functional Division	Examples of Diseases or Defects Affecting Each Division
Protective	
Bony socket within the skull, eyelids, eyebrows, eyelashes, tears.	Trachoma - many affect eyelid as well as cornea and conjuctiva.
Refractive	
Light focussing system - cornea, acqueous fluid, lens and vitreous jell.	Myopia - near sightedness. Hyperopia - far sightedness. Cataract - opacity of crystalline lens. Astigmatism - irregularity of cornea or lens. Glaucoma - damage to eye due to increased pressure from accumulation of acqueous fluid.
Directive	
Six muscles connected to the outside of the eye. Used to turn eye up or down or to either side.	Strabismus (squint) faulty muscle co-ordination. Nystagmus - rapid involuntary movement of the eyeball. May be secondary to a variety of visual disorders and brain injury.
Receptive	
Retina, optic nerve, visual centres of the brain.	Retrolental fibroplasia - scar tissue behind lens of the eye - caused by giving excessive oxygen to premature infants. Retinitis pigmentosa - hereditary degeneration and atrophy of the retina characterised by misplaced pigment. Optic atrophy - degeneration of nerve fibres connecting retina to the brain (occipital lobes).

Adapted from Harley, 1973, 414-416.

THE BRAILLE SOCIETY

Telephone: 621122

61 Kitchener Avenue,
Victoria Park

P.O. Box 7,
Victoria Park

EYE CERTIFICATE

NAME (Surname first) IN CAPS..... AGE.....

ADDRESS..... SEX.....

* 1. Principal Cause of Blindness?

Cornea	Lens	Retina	Nerve	Glaucoma	Misc.

2. Associated ocular and general medical causes?.....

3. Sketch the visual fields if relevant

†4. What Percentage of Sight Remains? Right..... Left..... 4. Is Vision Capable of Improvement?.....

Ophthalmologist's Signature..... Date .....

* Please QUALIFY the principal diagnosis as far as possible e.g. { Congenital Cataract / Diabetic Retinopathy / Chronic Simple Glaucoma

† See over for O.S.A. Guide

OPTHALMOLOGICAL GUIDE

Corrected Visual Acuity of Affected Eye	INCAPACITY (Percentage Equivalent of Total Loss of One Eye)
6/60	80 per cent.
6/36	75 " "
6/24	65 " "
6/18 = ¼ V.	50 " "
6/12	35 " "
6/9	10 " "
6/6	0

FIELD OF VISION

Loss of all but central vision within 5° circle (bilateral)	90 per cent.
Loss of all but central vision within 5° circle (unilateral)	45 per cent.
Loss of central vision but fields full (bilateral)—patient has no useful vision—"Blind"	95 per cent.
Loss of central vision but fields full (unilateral)—patient has no useful vision.	90 per cent. of one eye.

In partial loss the fields are considered to be divided into three arbitrary concentric zones of 30°, 60°, and 80°.

Relative importance of loss of outer zone	20 per cent.
Relative importance of loss of middle zone	30 per cent.
Relative importance of loss of inner zone excluding macular vision.	50 per cent.
Unilateral Aphakia with vision correctable to 6/6 and with 6/6 vision in other eye and full fields	70 per cent. minimum.

In other cases assessment to be increased according to correctability and other factors in this table.

TRAUMATIC CATARACT: Not operated on. Varying from 75 per cent to 100 per cent according to prospects of success.

DETACHMENT OF RETINA: Assess according to fields. Eventually usually 100 per cent.

INJURY THE EXCITING CAUSE OF DISEASE: e.g., interstitial Keratitis. Assess incapacity ascribing full cause to injury, with allowance for pre-existing disability, if any.

OCULAR PARALYSIS: If paralysis is final and stationary = loss of binocular vision—50 per cent.

LID INJURIES: Assess in conjunction with a general medical referee. (Exercise of individual judgement.)

Note: *Where two or more of these conditions are present together, the disability is not necessarily the sum total of the several disabilities.*